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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/763,891	06/11/2001	Takeshi Uchida	566.39787X00	3852

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EXAMINER

UMEZ ERONINI, LYNETTE T

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 01/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)	
09/763,891	UCHIDA ET AL.	
Examiner	Art Unit	
Lynette T. Umez-Eronini	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 6 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
- 4a) Of the above claim(s) 11-15 and 23-33 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-10, 16-22 and 34-41 is/are allowed.
- 6) ☒ Claim(s) 42-51 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 9/4/2003.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Oath/Declaration

1. The affidavit under 37 CFR 1.132 filed 9/8/2003 is sufficient to overcome the rejection of claims 1-10, 16-22, respectively as based upon the and 103 rejection of the claims.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 42-48 and 50 are rejected under 35 U.S.C. 102(b) as being anticipated by Luo et al (CMP-MIC conference 1996 ISMIC –100P/96/0145).

Luo teaches, "The chemical-mechanical polishing (CMP) of copper was conducted with ferric nitrate. . . and 1H-benzotiazole (BTA) . . . A surfactant, poly (ethylene glycol) . . . was employed to stabilize the polishing slurry" (page 1450. The aforementioned reads on,

A polishing solution for a metal, comprising:

a first protective-film which is a compound; and

a second protective-film forming agent.

Since Luo uses a polishing solution that comprises the same chemicals, which are used to polish the same material as in the claimed invention, then using Luo's first protective-film forming agent in the same manner as the claimed invention would inherently result in a compound capable of forming a protective film by physically adsorbing the first protective film forming agent with the metal film surface; then using Luo's second protective-film forming agent in the same manner as the claimed invention would inherently result in a compound which assists the first protective-film forming agent in forming a protective film; and using Luo's polishing solution in the same manner as the claimed invention would inherently result in having a chemical mechanical polishing rate of the metal of at least 100 nm/minute and an etching rate of the metal of at most 10 nm/minute, **in claim 42**, wherein said etching rate is 1 nm/minute or lower, **in claim 44**; wherein said chemical mechanical polishing rate is 250 nm/minute or higher, **in claim 45**;

The said aforementioned further reads on,

The solution consisting essentially of said first protective-film forming agent and said second protective-film forming agent, **in claim 43**;

wherein said first-protective agent is at least one selected from the group consisting of azoles, **in claim 44**; and benzotriazole, **in claim 47**;

wherein said second protective-film forming agent is a compound having vinyl polymer, **in claim 48**; and

wherein said metal contains at least one selected from the group consisting of copper, **in claim 50**.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claim 49 is rejected under 35 U.S.C. 103(a) as being unpatentable over Luo (CMP-MIC) as applied to claim 42 above, and further in view of Ronay (US 5,876,490).

Luo differs in failing to specify compounds that are second protective-film forming agents as recited **in claim 49**.

Ronay teaches a slurry that comprises a abrasive particles and polyelectrolyte (polyions), (column 4, lines 55-56), which can be bound to the polishing abrasive particles, which includes acidic groups such as poly(acrylic acids) (column 5, lines 26-31) and which is the same as applicant's second protective-film forming agent.

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Luo by using the second protective-film forming agent as taught by Ronay for the purpose of improving planarization (column 6, line 67 - column 7, line 3).

7. Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over Luo (CMP-MIC) as applied to claim 42 above, and further in view of Hayashi et al. (IDEM, 1992).

Luo differs in failing to teach the polishing solution for the metal, which substantially does not contain any abrasive grains.

Hayashi teaches an abrasive-free, chemical-mechanical-polishing technique in which aqueous amine and hydrogen peroxide solution is used as a polishing liquid (p. 976, 1st paragraph).

It is the examiner's position to modify Luo by using an abrasive free polishing liquid as taught by Hayashi for the purpose of minimizing scratches of the polished surface.

Allowable Subject Matter

8. Claims 1-10, 16-22, and 34-41 are allowed.
9. The following is a statement of reasons for the indication of allowable subject matter: Applicants' affidavit has provided experimental results (see pages 2-6), which show that glycine and/or an amidosulfuric acid fail to qualify as a second protective-film forming agent as in the present invention and which achieved an unexpectedly greater polishing rate and unexpectedly lower etching rate by using the solution of Example 7 of the present invention when compared to using Sasaki's (in US Patent 5,779,095) polishing solution.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 571-272-1470. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1435. The fax phone numbers for the organization where this application or proceeding is assigned are for regular 571-273-0223.

Lynette T. Umez-Eronini
ltue

December 29, 2003